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C-A OPERATIONS PROCEDURES MANUAL

7.1.65 Preparation for Personnel Entry of RHIC Helium Refrigerator Vacuum Tanks
at Bldg. 1005S and the Valve Box Vacuum Tanks in Bldg. 1002B, 1004B,
1006B, 1008B, 1010A AND 1012A

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Approved: Signature on File
Collider-Accelerator Department Chairman Date

A. Etkin

7.1.65 Preparation for Personnel Entry of RHIC Helium Refrigerator Vacuum Tanks at Bldg. 1005S and the Valve Box Vacuum Tanks in Bldg. 1002B, 1004B, 1006B, 1008B, 1010A AND 1012A

1. Purpose

To prepare the vacuum tank for routine access. Such normal tasks would include leak checking, maintenance and repair of sensors.

This procedure applies to the five vacuum tanks of Cold Boxes 1 through 5, the vacuum tank "addition" on the building end of Cold Box 5 and the Valve Box vacuum tanks in buildings 1002B, 1004B, 1006B, 1008B, 1010A and 1012A. These areas are classified as Confined Spaces per ES&H Standard 2.2.4.

2. Responsibilities

- 2.1 The Line Supervisor is to assure that no Oxygen Deficiency Hazard (ODH), or toxic or flammable gases, exist before any personnel are allowed inside the tank.
- 2.2 The Line Supervisor is the person who is responsible for issuing the confined space certification for entry and for ensuring that the activities, which are planned after entry into the tank, are conducted in accordance with the established ES&H rules and guides of the Laboratory.
- 2.3 The Facility Support Representative/Designee, or qualified C-A personnel, are responsible for performance of the air surveys.

3. Prerequisites

- 3.1 Special mount vent fan to be positioned at one manhole of the vacuum tank. Fan is 5/8 HP, ILG Industries Model 213 (rated at 4800 CFM of free air), or exhaust fan with hosing of sufficient length to reach top far end of tank.
- 3.2 A functionally-tested portable oxygen monitor with a valid calibration date (note: a personal oxygen monitor may be used).
- 3.3 Hard hats, safety glasses, etc. (depending on nature of work).

4. Precautions

- 4.1 When toxic or flammable substances are to be used in the tank, the space shall be classified as a Class 2B or 2C Confined Space, and is not covered by this procedure. In this event, ES&H Standard 2.2.4 requires that the C-A ES&H Coordinator review the activity, and determine if a Confined Space Entry Permit is required.

- 4.2 Any tasks requiring open flames or welding shall comply with ES&H Standard 4.3.0, Cutting and Welding. In addition ES&H Standard 2.2.4 requires that the C-A ES&H Coordinator review the activity and determine if a Confined Space Entry Permit is required.
- 4.3 Extension cords brought inside a tank to provide electric power shall be protected with a portable ground fault interrupter.

5. Procedure

- 5.1 If the vacuum tank is pumped by a diffusion pump system, proceed to step 5.5.
- 5.2 Close the valve that isolates the tank from the vacuum pump.
- 5.3 Open the vent valve to fresh air.
- 5.4 Wait for pressure in tank to rise to ambient and proceed to step 5.10.
- 5.5 Turn off heaters for the diffusion pump on the tank to be entered. Leave the cooling water flow to the pump and the baffle on. Isolation valve between the diffusion pump and the tank is to be left open.
- 5.6 Wait for diffusion pump to cool. Pump should be cool to the touch before proceeding. Close the isolation valve between the fore pump and the diffusion pump.
- 5.7 Open 1-inch vacuum valve located on the diffusion pump to introduce air into vacuum tank.
- 5.8 Wait for pressure in tank to rise to ambient.
- 5.9 Close the isolation valve between the diffusion pump and the tank.
- 5.10 Open the manhole(s).
- 5.11 For tanks with one manhole or in which full flow through of air can not be established. Skip to 5.13.
- 5.12 Place fan so that air is forced into the tank at one manhole, and flows out the other. Check that exhaust air flow has been established. Skip to 5.14.
- 5.13 Use exhaust fan with hosing of sufficient length to reach top far end of tank to exhaust air from top of tank.

5.14 Allow purge flow to continue for at least 15 minutes (approximately 10 to 15 air changes).

5.15 Remove fan from manhole.

Danger

Do not enter tank to perform step 5.16. An ODH condition may exist in the tank.

5.16 Using extended probe, survey the tank at each manhole and check with a portable/personal ODH monitor to assure oxygen range is above 19.5%.

5.17 The Line Supervisor shall assure that each person who enters the tank is aware of the hazards therein, and especially that they are aware of the prohibition on flammable or toxic cleaners and solvents, and the prohibition on welding or open flames.

5.19 Personnel cleared by the procedure above may now enter the tank.

6. Documentation

6.1 The Line Supervisor shall retain the certification record.

7. Reference

7.1 ES&H Standard 2.2.4, Confined Spaces.

7.2 ES&H Standard 4.3.0, Cutting and Welding.

8. Attachments

None